

SCIENCE-BASED SUBSTANCE ABUSE PREVENTION

DRAFT

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INTRODUCTION

This working paper focuses on the characteristics of effective substance abuse prevention interventions, primarily for youth. It was developed in response to a request by the Secretary of the U. S. Department of Health and Human Services in the spring of 1997 for a short statement on what is known about effective substance abuse prevention interventions, based on the science. The Department of Health and Human Services was at that time launching a Youth Substance Abuse Prevention Initiative. That Initiative has since grown to include State Incentive Grants to 19 Governors. These grants are intended to help the States mobilize and coordinate prevention resources from many Federal, State, and local agencies, and from the private sector as well, to help prevent youth substance abuse. The Initiative has also led to the funding of five Regional Centers for the Application of Prevention Technology, which are helping the States with State Incentive Grants, and to the expansion of the National Household Survey on Drug Abuse, so that statistically valid estimates can be made on drug abuse each year in each State.

The paper was put together by senior officials and scientists from the Department of Health and Human Services, with substantial help from senior staff from the Department of Education, the Department of Justice, and the Office of National Drug Control Policy, with additional suggestions from officials in other departments. The paper draws upon various reviews of the literature, including the National Institute on Drug Abuse's 1997 publication entitled *Preventing Drug Use Among Children and Adolescents: A Research-Based Guide*, a similar internal review prepared by the National Institute on Alcohol Abuse and Alcoholism, literature reviews compiled by the Substance Abuse and Mental Health Services Administration, and others. The paper is not itself a scholarly document (there are no citations to the literature), and that was by design. The Secretary wanted a piece that was simple and easy to read, and yet scientifically accurate. The science of substance abuse prevention is growing, and she wanted the widest possible audience to have access to the evidence that has been emerging from that science.

The field of substance abuse prevention is extremely broad, and it is closely related to other literatures and systems, such as the educational system, the correctional system, and family and social systems. The term "substance abuse" itself is variously defined and used. In this paper, the terms "drug" use or abuse and "substance" use or abuse are variously used to refer to the use and abuse of illicit substances (such as marijuana, cocaine, and heroin), the use by youth of alcohol and tobacco, and the unsafe use of other substances (such as inhalants). It is clear that there are

significant differences in the social, cultural, legal, and pharmacological aspects of alcohol, tobacco, and the various illicit drugs. No single term or approach may fit all of these substances, and satisfy all audiences, in all uses and contexts. Nevertheless, the Federal contributors to this working draft believed that an effort should be made to identify and discuss the key characteristics of preventive interventions that address alcohol, tobacco, and illicit drugs, and to try to identify the major commonalities and make the necessary distinctions.

To make this complex literature widely available to interested practitioners and lay persons, regardless of their training, the paper has been organized around the following simple questions: What do we know about the characteristics of effective substance abuse preventive interventions? How do we know what we know? What should we do next? A final version of this paper is likely to be prepared in the next several months for broader distribution.

I. WHAT DO WE KNOW ABOUT THE CHARACTERISTICS OF EFFECTIVE SUBSTANCE ABUSE PREVENTIVE INTERVENTIONS?

What do we know, based on the science, about the characteristics of effective substance abuse preventive interventions across the full range of kinds of such interventions? The characteristics discussed below have been documented (in various ways) by science, but our understanding of them can nevertheless benefit from additional research and by scholarly literature reviews of the scientific literature that focus on the characteristics of preventive interventions that have been proven to be effective. We need to know more precisely the extent to which, and the conditions under which, various characteristics contribute to the effectiveness of substance abuse preventive interventions, in general and for particular interventions and particular target populations. Also, we need to clarify whether there are subsets of characteristics that must be present for certain interventions to be effective.

The characteristics are organized in response to the classic journalistic questions: Who? What? When? Where? How? and Why?

A. WHO SHOULD THE PREVENTIVE INTERVENTIONS FOCUS ON?

1. Clearly Defined Individuals and Groups

Substance abuse preventive interventions seem to work well when they focus on individuals and groups of individuals that are clearly defined by age, sex, race/ethnicity/nationality/culture, income, and geographic location. Clearly defining the target population allows interventions and policies to address the major risk and protective factors and the major drugs of abuse for the target population, in ways that are appropriate, understandable, and effective. A statement that holds true in many arenas certainly holds true for substance abuse prevention: One size does not fit all. Interventions need to be tailored to specific populations. An intervention can be defined by the population it addresses. For example, a universal intervention addresses the whole of a population, without regard to problem severity; a selective intervention addresses a sub-group

within the population that is at greater than average risk of developing a problem outcome; and an indicated intervention addresses individuals that carry a high burden of risk of developing the problem outcome. The use of these three categories has been recommended by the Institute of Medicine.

2. Peers, Parents, and Other Caring Adults

Substance abuse preventive interventions seem to work well when they also address the peers, family members (especially parents), and other significant adults that are important for these target populations. For their continuing viability in communities, preventive interventions also need to be acceptable to community leaders, who control and manage resources.

Peers. Peer group beliefs and behaviors, for example, can be potent for youth. Peer pressure to use drugs can be difficult for youth to resist. Encouraging association with non-drug-using schoolmates, teammates, siblings, and friends can make it easier for youth to not use drugs.

Parents. Research has compellingly documented the effectiveness of strong, supportive, and skillful parents and families in helping youth to not use alcohol, tobacco, illicit drugs. A variety of parent and family interventions have been demonstrated to be effective, such as behavioral parent training, family skills training, and family therapy.

Other Caring Adults. Many youth who have successfully made it through high-risk families and communities later attributed their success to the presence and support of one or more caring adults outside their immediate families. Such adults, whether they are coaches, teachers, neighbors, relatives, or Big Brothers and Big Sisters, can offer youth the vision and conviction that there are alternative, drug-free ways to live a life and succeed.

B. WHAT SHOULD THE PREVENTIVE INTERVENTIONS FOCUS ON?

1. Major Forms of Substance Abuse

Substance abuse preventive interventions are likely to be more effective when they target all the major substances of abuse, including the underage use of alcohol and tobacco by youth. This is plausible in view of the increase in polydrug abuse and the ease of switching from one drug to another. More narrowly targeted efforts (for example, on marijuana alone) may be effective in reducing marijuana use, but they probably should be supplemented by interventions that focus on the wider variety of substances that are being abused in a particular population. Drugs to be addressed in many communities include tobacco and alcohol (for those who are underage), marijuana, inhalants, cocaine (both powder and crack), and heroin.

2. Major Risk and Protective Factors

Substance abuse preventive interventions are more likely to be effective when they address the major risk factors (that contribute to drug use and abuse) and the major protective factors (that protect against drug use and abuse) than if they focus on less salient factors. Such interventions are more likely to be effective, whether they are universal, selective, or indicated interventions - that is, whether they focus on the population as a whole, a subgroup of the population that is at high risk, or a subgroup that is already exhibiting the early signs of drug use. One way of presenting some of the major risk factors and some of the major processes that protect against drug risks is presented below:

Key Risk Factors for Substance Abuse:

A. Individual

- Biological predisposition (inherited or acquired)
- Shy and aggressive temperament (at a young age)
- Irritable temperament (at a young age)
- Mental disorders, such as clinical depression and anxiety
- Sensation-seeking personality and behaviors
- Low sense of self-efficacy
- Alienation, rebelliousness, and anti-social attitudes
- Early drug use (such as tobacco, alcohol, and marijuana)
- Underestimation of the consequences and harmfulness of drug use

B. Family

- Parents who use drugs
- Parents who favor (or are ambivalent about) the use of drugs
- Family history of substance abuse
- Family management problems

C. Peer

- Friends with anti-social norms and behaviors
- Friends who favor drug use
- Friends who use drugs

D. School

- Low commitment to school
- Academic failure

E. Community

- Easy access to drugs
- Inadequate or poorly enforced anti-drug laws, regulations, and policies
- Community norms that favor drug use
- Disorganized community
- Economic and social deprivation

Key Protective Processes That Counter Substance Abuse Risks:

- Bonding to family, school, and community
- Neighborhoods with clear norms opposed to substance abuse
- Development of effective socialization skills that are relevant to interpersonal communications, decision making, self-assessment, and emotional regulation (of anger, frustration, disappointment, failure, and the like)
- Opportunities for rewarding participation in activities involving the family, school, and community

These, and other, risk and protective factors and processes interact and cumulate in complex ways. The literature increasingly reports that the risk for adverse outcomes - such as substance abuse, violence, and arrests - increases as the number of risk factors increases, almost without regard to the particular risk factors involved. This cumulative, interactive effect has major implications for the design and implementation of successful preventive interventions.

3. Expectancies About Substance Use and Abuse

Also relevant, although there is less research on this, is a focus on the role that individual needs, motivations, and expectancies may play in contributing to the use and abuse of various drugs. For example, individuals may turn to different drugs with the expectation of reducing undesirable feelings or conditions, such as tension, anxiety, loneliness, boredom, depression, fear, impotence, appetite, or weight. They may also turn to drugs with the expectation of increasing desired states, such as sociability, alertness, excitement, concentration, strength, creativity, the flow of ideas, or a sense of belonging. More simply, they may turn to drugs to defy rules or satisfy curiosity. Such needs, motivations, and expectancies undoubtedly interact complexly with the risk and protective factors.

Substance abuse preventive interventions often emphasize the adverse consequences of substance use and abuse. Their effectiveness may be further enhanced when they address the needs and motivations behind the substance use and abuse of a target population, when they address cognition related to substance use, and when they encourage or provide safe and healthy alternatives to substance use.

4. Appropriate Information About Substance Abuse

Substance abuse preventive interventions can help individuals make the right decision not to use drugs, by providing them with information that is accurate, relevant, credible, culturally appropriate, age-appropriate, and sensitive to their needs and motivations. Information can be shared with targeted individuals and also with their peers and family members, especially parents. Various techniques can be used to share such information, including posters, brochures, school curricula, interactive discussions, computer websites, workplace education and training, payroll stuffer messages, and public service announcements on radio and television.

Helpful information. Research suggests that it can be helpful to share information about the harmfulness of drug use, the social disapproval of drug use, the actual (as opposed to perceived) extent of drug use, and alternatives to drug use.

Potentially harmful information. Some information, such as explicit descriptions about how various drugs are used (including information about household products that can be used for their drug effects), has been found at times to be associated with increases in drug use.

Credibility. Information needs to be credible. Scare tactics which exaggerate the adverse effects of drugs, for example, may reduce the credibility of other anti-drug use messages, making it easier for youth to ignore such messages and also, possibly, increasing their willingness to use drugs.

5. Anti-Drug-Using Attitudes and Norms

Information by itself is often not enough to reduce drug abuse. Communities, peer groups, and families that articulate and enforce beliefs and expectations about the non-use of illicit drugs can influence the beliefs, expectations, and behaviors of youth, both individually and in groups. For example, youth who perceive drug use to be socially acceptable, and who overestimate the prevalence of drug use among their family members and peers, report higher levels of drug use themselves, whereas youth who perceive drug use to be socially unacceptable report lower levels of use.

Tobacco and alcohol. Tobacco research has shown the effectiveness of deglamorizing the use of tobacco and restricting tobacco advertising. Alcohol research has shown the effectiveness of some mass media campaigns in promoting greater awareness of the personal risks of violating laws against alcohol (for example, via sobriety check points) and greater support for such policies.

Drug testing. Clear expectations can also be set and enforced through, for example, drug testing, which is associated with lower rates of drug use, at least in controlled settings such as workplaces or the military. Again, the correlation may in part reflect self-selection: drug users may choose not to participate in those settings. However, it seems plausible that drug testing also contributes to changes in attitudes and behaviors about drug use and abuse, reducing the willingness to use drugs because of the penalties associated with being caught.

6. Life Skills and Drug-Refusal Skills

Non-drug-using attitudes and norms are also, by themselves, not necessarily enough to prevent drug use. One of the best-documented approaches to preventing substance abuse is to teach and reinforce life skills (related to impulse control, communications, problem solving, conflict resolution, and resiliency) and drug refusal skills. These skills go beyond the acquisition of information about drug use and abuse and beyond the reinforcement offered by anti-drug-using attitudes and norms. They are tools that youth can use to shape their behaviors, especially as they make their way through their developmental years and encounter opportunities to use and sell illicit drugs. Learning and practicing these skills in situations that mimic real-life situations can strengthen the ability of youth to make non-drug-using decisions and engage in drug-free activities in the real world, and not just in the classroom.

7. Key Environmental Factors

Substance abuse preventive interventions can be effective when they address a variety of key environmental factors. For example, environmental factors (such as limitations on the physical and economic availability of substances) and community-wide policies can reduce the initiation of substance use and the progression to substance abuse.

Especially for alcohol and tobacco, policy research has documented the effectiveness of such strategies and interventions. For tobacco, effective strategies to reduce availability include increasing the cost of tobacco products and decreasing minors' access to tobacco products. For alcohol, effective community-wide policies include constraining the availability of beverage alcohol (including State control of alcohol sale, as opposed to privatization), lowering the legal level of blood alcohol concentration, penalties that are swift and certain and severe (such as license revocation for driving while intoxicated or driving under the influence of alcohol), mass media prevention messages, and community mobilization and activation.

C. WHEN SHOULD THE PREVENTIVE INTERVENTIONS OCCUR?

1. Early Enough

Early problems. The scientific literature is making it more and more clear that the failure to prevent early childhood aggression or drug use increases the likelihood of more serious negative behaviors, including delinquency and drug abuse, later. Some studies have found a progression from the early use of tobacco and alcohol to the later use of other drugs such as marijuana, cocaine, and heroin. However, no causality has been established, the sequencing varies, and most individuals who try alcohol and tobacco do not go on to use these other drugs. Nevertheless, those who use alcohol and tobacco at very early ages do seem to be at higher risk for the later use and abuse of other drugs.

Early interventions. Substance abuse preventive interventions are more likely to be effective when they start early enough to prevent the use and abuse of substances later on. Depending on the target population, this can mean that the intervention should start extremely early (for example, pre-natal care for pregnant drug users), very early (for example, early childhood interventions for those in high-risk families or communities or for those who manifest early childhood aggression), or less early (for example, junior high school interventions for those in more stable and lower-risk situations). Children in drug-using or abusive families are particularly vulnerable to engaging in the use and abuse of drugs themselves or to being adversely affected by others in the family who use and abuse drugs.

2. Often Enough

Substance abuse preventive interventions seem to work well when they are reinforced in booster sessions that are age-appropriate. One-time-only efforts may contribute to the prevention of drug use in the short term, but they cannot ensure that youth will be “inoculated” against drug use over the longer term. Drug use can be encouraged by environmental factors (such as the availability of drugs, the marketing of drugs, and the use of drugs by friends and family) and individual developmental factors (such as the proclivity of many adolescents to engage in defiant and risk-taking behaviors that test the boundaries that have been set for them), and these factors can make it difficult for youth to resist offers to use drugs, despite lessons learned in earlier years. As children grow older, substance abuse preventive interventions are likely to be needed to reinforce earlier efforts in ways that are age-appropriate.

D. WHERE SHOULD THE INTERVENTIONS OCCUR?

1. Key Community Settings

Safe and supervised activities and settings can help youth not to use illicit drugs. Activities can be with parents, other adults, or peers. Such activities seem more likely to be effective substance abuse prevention interventions if they take place in settings (such as homes, schools, workplaces, recreational settings, and community-wide settings) that are free of illicit drugs. Efforts that help these settings to be drug-free and supportive reduce the likelihood that youth will use drugs in those settings. For each of the major settings, preventive efforts can be launched, such as:

Homes - for example, parenting interventions, plus clean sweeps of public housing, to remove drug dealers illegally residing there;

Schools - for example, drug-free school zones, school climate change approaches, student assistance programs, comprehensive school health clinics, and substance-free housing on college campuses;

Workplaces - for example, anti-drug-use policies, drug testing, drug education, supervisory training, and employee assistance programs;

Recreational and other developmental settings - for example, Boys and Girls Clubs, churches, parks and recreational facilities and activities; and

Community - for example, anti-drug community coalitions, neighborhood watches, and community policing to help remove drug dealers from neighborhoods.

Although more research is needed on these kinds of setting-specific preventive interventions, it is plausible that the more extensive the range of drug-free, safe, and supportive settings there are in a community, the greater is the likelihood that drug-free behaviors will be encouraged, reinforced, and realized. When universal and selective interventions at the community level are combined with selective and indicated interventions that are embedded in the major settings, the resulting mix is likely to be particularly potent for reducing the risk for adverse outcomes and for enhancing resilience in the community as a whole and among individuals.

E. HOW SHOULD THE PREVENTIVE INTERVENTIONS BE IMPLEMENTED?

1. Interactively

Strictly didactic approaches are less likely to be effective than approaches that emphasize participation and interaction. Youth are more likely to learn, accept what they learn, and act on what they learn if they can ask questions and interact extensively with the teachers, parents, coaches, police officers, doctors, other adults, or peers who are trying to instill and reinforce anti-drug-using knowledge, attitudes, and behaviors. Youth, in this way, become more satisfied with and committed to the meaning and applications in their own lives of the anti-drug-use efforts. By interacting extensively with adults and peers in substance abuse prevention interventions, youth become bonded to non-drug-using peers and adults, in ways that carry over into their current and future lives. Scientific studies demonstrate the protective effects of bonding to pro-social peers and adults. When youth work or play well with non-drug-using peers and adults, and when they learn to respect and trust them, the likelihood of substance use and abuse is significantly diminished.

2. With Multiple Modalities

Substance abuse preventive efforts are more likely to be effective when they are multi-modal, using a variety of strategies such as didactic, discussion, video, cd-rom, and the like, rather than using only single approaches. Such multi-modal, more comprehensive approaches can address a wide range of ages, risk and protective factors, forms of substance abuse, significant peers and adults, policies, and activities and settings, and can do so by sharing information, shaping attitudes and norms, building skills, encouraging pro-social bonding, strengthening the role of parents in discouraging drug use, and reducing the availability of substances via community-wide policies. A strong focus on behavior, and not just on knowledge or attitudes, is important in every

community. A community may wish to select, from among the characteristics of effective prevention efforts, those intervention characteristics that seem to best fit the needs of that community. There is no single best way of combining the characteristics of effective efforts into a comprehensive effort.

3. With Community-Wide Policies

The use and abuse of alcohol and tobacco can be effectively prevented or reduced by a variety of anti-drug policies, including laws, regulations, sanctions, formal and informal norms, and their enforcement, that take effect in the community as a whole. Research on such environmentally focused interventions, sometimes as “natural experiments” (which nevertheless can be rigorously designed and implemented) rather than as controlled experiments, has been more extensive for alcohol and tobacco than for the illicit drugs such as marijuana, cocaine, and heroin, where researchers have focused more on individual interventions. This is the case largely because the purchase and use of alcohol and tobacco are legal in this country for persons 21 and 18 years old and older, respectively, and States have therefore enacted and implemented diverse laws and regulations governing the sale, promotion, distribution, and taxation of alcohol and tobacco.

These laws and regulations have provided extensive opportunities for research on the effects of these different measures on the purchase, use, and abuse of alcohol and tobacco.

For tobacco, effective strategies (some of which were previously cited under environmental strategies, above) include increasing the cost of tobacco products, decreasing minors’ access to tobacco products, reducing exposure to environmental tobacco smoke, deglamorizing and denormalizing the use of tobacco products, and reducing the appeal of tobacco via advertising restrictions and counter-advertising.

For alcohol, effective strategies (also, in part previously noted above) include constraining the availability of beverage alcohol (including State control of alcohol sales, as opposed to privatization), lowering the legal level of blood alcohol concentration, penalties that are swift and certain and severe (such as license revocation for driving while intoxicated or driving under the influence of alcohol), mass media prevention messages, and community mobilization and activation.

F. WHY SHOULD PREVENTIVE INTERVENTIONS BE IMPLEMENTED?

1. To Reduce Substance Abuse

The primary purpose of a substance abuse preventive intervention is to prevent and reduce the use and abuse of substances. As noted earlier, preventing substance abuse, especially early on, reduces the likelihood of more serious negative behaviors, including delinquency, later on. Measures of substance use and abuse should therefore be used as the primary measures of success of these interventions. Process and other interim measures can also be useful, but they are not by

themselves enough to prove that an intervention is effective in preventing or reducing substance use and abuse. Nor is it enough to document that an intervention has led to a change in attitudes only. Reductions in casual or experimental drug use may be significant goals, but reductions in more serious drug abuse should also be addressed and documented.

2. To Reduce Other Related Problem Behaviors

It is likely that reductions in drug abuse will be associated with reductions in other related problem behaviors and situations - such as unemployment, incarceration, physical or sexual abuse, and dropping out of school - and these problem behaviors and situations often affect those who come in contact with drug abusers, in addition to affecting the drug abusers themselves. These other related problem behaviors and situations can be measured and used as valid additional indicators of the effectiveness of prevention efforts.

II. HOW DO WE KNOW WHAT WE KNOW?

Based on more than twenty years of rigorous research, a science of substance abuse prevention is now emerging. Sound theories and significant program findings characterize this science. The studies focus on the systematic and objective study of the efficacy and effectiveness of theory-based and empirically-based substance abuse preventive intervention programs and policies. The studies use observational and controlled experimental and quasi-experimental research designs that meet high standards for rigorous research.

Substance abuse prevention science follows a cancer research model. In this model, studies are conducted across five phases of research: (1) hypothesis development and exploratory studies, (2) methods development, (3) controlled efficacy trials, (4) defined population and effectiveness studies, and (5) implementation studies. The model is now being modified to accommodate the special requirements of alcohol and drug abuse research, to document substance abuse prevention principles, practices, and policies that are statistically, clinically, and socially significant in preventing substance abuse. Research into the effectiveness of substance abuse prevention interventions needs to be made more and more rigorous, consistent with the five phases of the above model.

This research collects outcome data that are systematically identified, assessed (or evaluated), synthesized, and reported in studies that guard against bias and misinterpretation. Research designs must control against a variety of threats to the validity and scientific integrity of studies. These include poorly defined theories, measurement errors, low statistical power, flaws in sampling, differential attrition, the inappropriate use of statistical analysis techniques, inadequate follow-up procedures, and other limitations in research designs.

A key tool in this process is the “hierarchy of evidence,” used by the U.S. Preventive Services Task Force in developing its “Guide to Clinical Preventive Services.” In this analytic model, a claim of preventive efficacy and effectiveness (as reported in the peer-refereed prevention

research literature) is assessed, with careful attention to the type of study design used to measure health outcomes after exposure to a preventive intervention. This approach gives more weight to study designs that are less subject to bias and misinterpretation. The hierarchy of evidence ranks study designs in descending order of importance, as follows: (1) randomized controlled trials, (2) non-randomized controlled trials, (3) cohort studies, (4) case-control studies, (5) comparisons of events between different times and places, (6) natural experiments, and (7) descriptive studies. Prevention studies can also be compiled and rated for the quality of their science and for their significance in reducing morbidity and mortality from substance abuse. A number of techniques can be used, including meta-analyses, consensus reviews, Cochrane Collaborations, expert opinions, and clinical experience. When prevention research is carefully scrutinized, using the best available evidence-based scientific review procedures, the results can be shared with the prevention community to improve the practice of substance abuse prevention. The peer-reviewed research literature constitutes a continually evolving knowledge base that can help increase the effectiveness of substance abuse prevention interventions.

III. WHAT SHOULD WE DO NEXT?

This paper can be used to help:

Guide the conduct of literature reviews. The characteristics presented here are known to be grounded in the scientific literature. However, some are more strongly supported by the science than are others, and some are more broadly applicable to a wide variety of circumstances than are others. Thorough reviews of the scientific literature, that focus on these characteristics one at a time, would clarify the strength of the scientific evidence and the conditions under which the characteristics apply.

Identify key areas needing additional research. The discussions of characteristics in this paper, especially when buttressed by literature reviews, can point to the need for additional research in key areas. For example, children who begin smoking cigarettes at young ages are known to be at higher risk of using other substances at older ages. However, it is less well documented that existing preventive interventions are able to prevent these early starters from starting.

Strengthen the science-based design of Federal program and budget proposals. Federal substance abuse prevention program and budget proposals could be required to address the emerging science base. For example, they could be required to address the characteristics in this paper and indicate how these characteristics are being incorporated in the basic program design and application requirements.

Increase the readiness of States and localities to use science-based prevention practices. Program planners and designers in States and localities could be made better informed about which characteristics have and have not been proven by the science to work. Such information would contribute to more rational decisions about what kinds of interventions to select or to design for implementation.

Tailor programs for general populations, populations at more than average risk, or populations at high risk of developing disorders. The characteristics of effective substance abuse preventive interventions can be used to help planners and administrators target their resources and tailor their program efforts at populations with varying degrees of susceptibility to substance abuse. For example, populations at greater risk or further along in the progression of substance abuse are likely to require interventions that are more intensive, more multi-pronged, in a wider variety of settings, and with more booster sessions.

Screen existing preventive interventions. Program planners and funders can screen existing substance abuse preventive interventions for the science-based characteristics that have been incorporated (or not incorporated) in their program designs.

Design and test new preventive interventions. Program planners and developers can use the science-based characteristics of effective interventions as the elementary building blocks for designing new substance abuse preventive interventions. They could focus first on a population, then on a substance, and then on a setting - for example, adolescents who use marijuana, with interventions in schools - and then work their way through the list of key characteristics to help guide them in the design of new interventions.

Design and conduct cost-effectiveness studies. Comprehensive prevention programs that appear to be very costly in the short run may actually contribute to enormous savings for the community in the longer run, especially when the interventions are targeted at the young. Long-term longitudinal studies of such comprehensive programs, that incorporate a plausibly broad range of key characteristics, may indeed demonstrate significant cost-effectiveness.

Train Federal, State, and local policy, budget, and program staff. Training could be provided to key Federal, State, and local officials and staff (involved in policy, budget, and program management and funding) about the grounding in science of some of the characteristics of substance abuse preventive interventions. Such training could help them design or review program proposals with a greater sense of the underlying science and how it supports certain kinds of interventions.